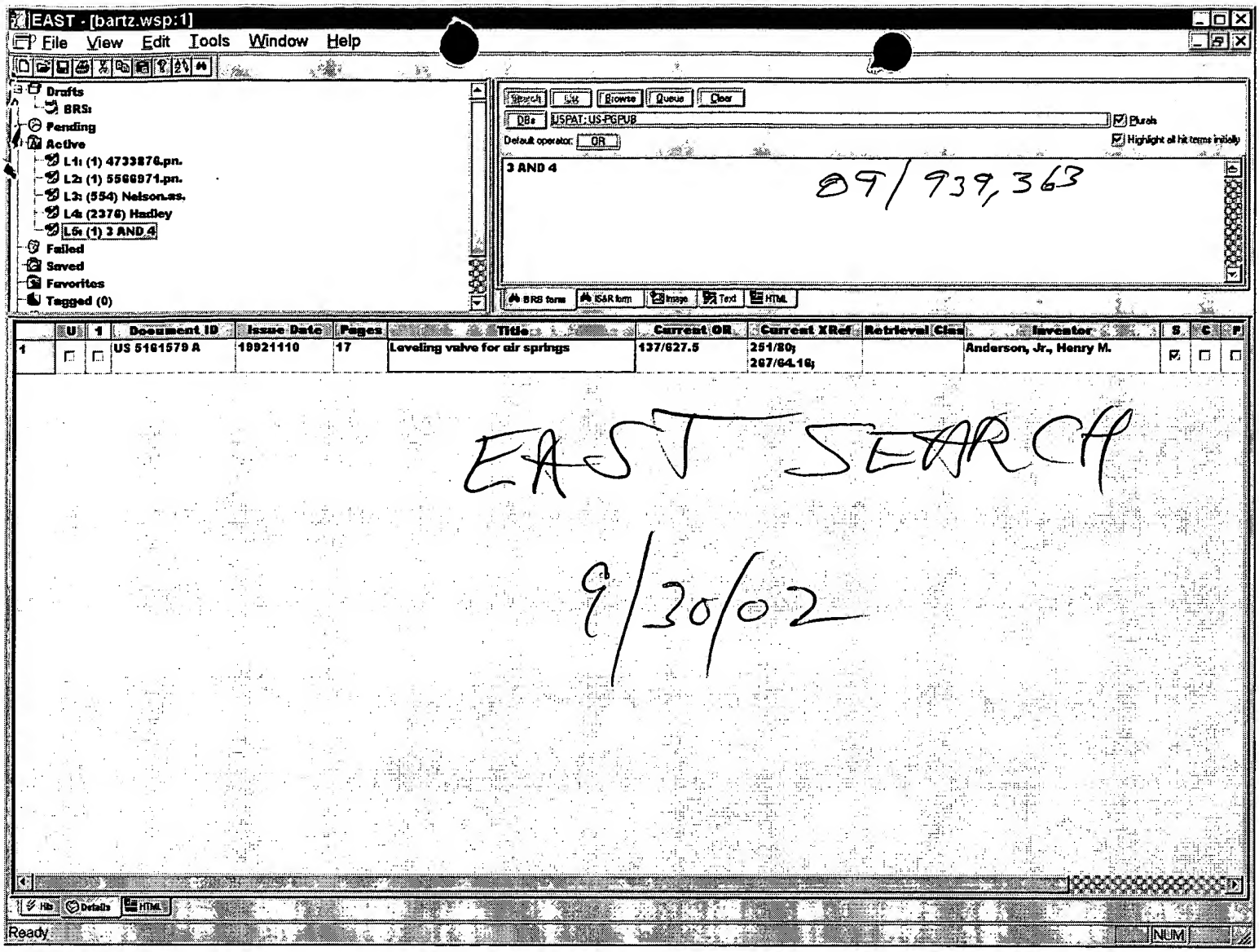

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DBs USPAT; US-PGPUB | Plurals

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	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef	Retrieval Cls	Inventor	S	C	P
1	☐	☑	US 6412790 B2	20020702	10	Vehicle suspension and rotary height control valve for same	280/6.159	137/625.22; 280/124.16		McKenzie, Thomas A. et al.	☑	☐	☐
2	☐	☑	US 6088551 A	20000718	22	Height control valve with integral dump device	267/64.16	267/DIG.1; 280/6.157		Haviland, Robin Lee et al.	☑	☐	☐
3	☐	☐	US 5860450 A	19990119	16	Height control valve for vehicle leveling system	137/627.5	280/124.16		Trudeau, Curtis A. et al.	☑	☐	☐
4	☐	☑	US 5787932 A	19980804	21	Bypass tube for time delay height control valve	137/627.5	137/636.1; 251/54		Pierce, William C.	☑	☐	☐
5	☐	☐	US 5682922 A	19971104	20	Dual in-line height control valve assembly	137/627.5	137/636.1; 251/54		Galazin, Gregory T. et al.	☑	☐	☐
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7	☐	☐	US 5375819 A	19941227	12	Dual in-line height control valve assembly	267/64.16	137/627.5; 137/636.1;		Galazin, Gregory T. et al.	☑	☐	☐
8	☑	☐	US 5335695 A	19940809	12	Height control valve with adjustable spool	137/627.5	280/6.157; 91/390		Pierce, William C.	☐	☐	☐

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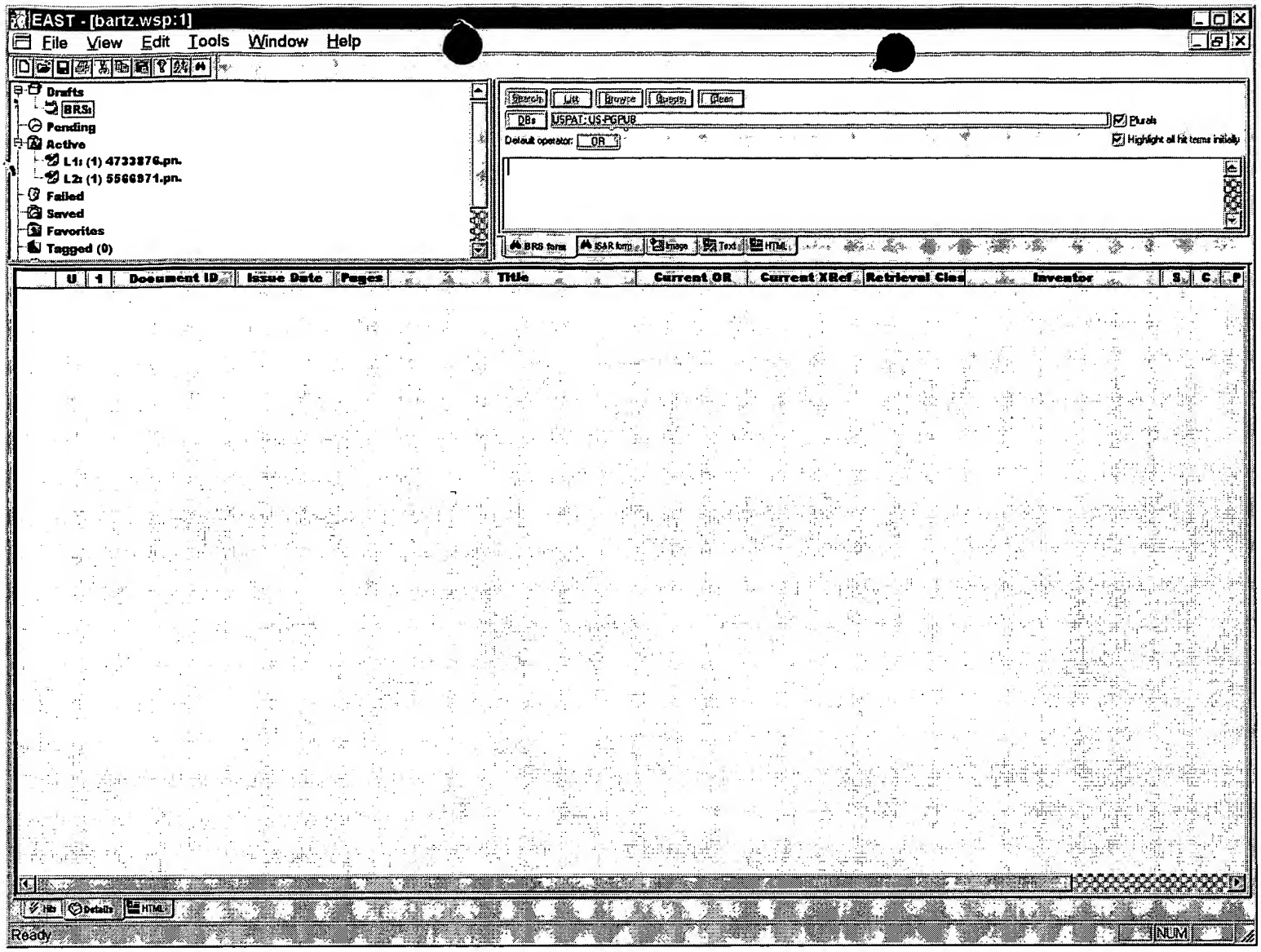
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US-PAT-NO: 4733876
DOCUMENT-IDENTIFIER: US 4733876 A
TITLE: Suspension and leveling system for a vehicle
DATE-ISSUED: March 29, 1988

INVENTOR-INFORMATION:

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Heider; Dale J.	Humboldt	IA	50548	N/A
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APPL-NO: 06/ 942606
DATE FILED: December 17, 1986

INT-CL: [04] B60G017/04
US-CL-ISSUED: 280/6H, 280/712 , 280/DIG.1
US-CL-CURRENT: 280/6.158, 280/124.116, 280/124.163, 280/6.153, 280/DIG.1
FIELD-OF-SEARCH: 280/6R; 280/6H ; 280/DIG.1 ; 280/712 ; 280/713

REF-CITED:
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2949316	August 1960	Davies et al.	280/DIG.1	N/A	N/A
3181877	May 1965	McHenry	280/DIG.1	N/A	N/A
3784221	January 1974	Frasier, Sr.	280/712	N/A	N/A
3836161	September 1974	Buhl	280/6H	N/A	N/A
3917307	November 1975	Shoebridge	280/6H	N/A	N/A
4580798	April 1986	Roelofs	280/6R	N/A	N/A
4580809	April 1986	Leaf	280/712	N/A	N/A
4641843	February 1987	Morrisroe, Jr.	280/6R	N/A	N/A

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FOREIGN-PAT-NO	PUBN-DATE	COUNTRY	US-CL
2141677	January 1985	GB	280/712

ART-UNIT: 316
PRIMARY-EXAMINER: Weaver, Ross

ABSTRACT:

The suspension system of the present invention includes an elongated spring having one end attached to the vehicle frame and having a second end. A pneumatic bag includes an upper end which is attached to the vehicle frame and a lower end. A securing bracket attaches the lower end of the bag and the second end of the elongated spring to the axle so that the weight of the vehicle frame above the axle is supported in combination by the spring and the air bag. A pneumatic control system is in communication with the bag for selectively introducing air to the bag so as to control the pressure within the bag and thereby control the height that the bag supports the vehicle frame above the

United States Patent [19]

Heider et al.

[11] **Patent Number: 4,733,876**
[45] **Date of Patent: Mar. 29, 1988**

[54] **SUSPENSION AND LEVELING SYSTEM FOR A VEHICLE**

[76] Inventors: Merle J. Heider, 203-12th St., SW.; Dale J. Heider, 1108-8th Ave., SW.; Leon J. Heider, R.R., all of Humboldt, Iowa 50548

[21] Appl. No.: 942,606
[22] Filed: Dec. 17, 1986
[51] Int. Cl.⁴ B60G 17/04
[52] U.S. Cl. ..... 280/6 H; 280/712; 280/DIG. 1
[58] Field of Search ..... 280/6 R, 6 H, DIG. 1, 280/712, 713

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2141677	1/1985	United Kingdom	280/712

Primary Examiner—Ross Weaver
Attorney, Agent, or Firm—Zarley McKee, Thomte, Voorhees & Sease

[57] ABSTRACT

The suspension system of the present invention includes an elongated spring having one end attached to the vehicle frame and having a second end. A pneumatic bag includes an upper end which is attached to the vehicle frame and a lower end. A securing bracket attaches the lower end of the bag and the second end of the elongated spring to the axle so that the weight of the vehicle frame above the axle is supported in combination by the spring and the air bag. A pneumatic control system is in communication with the bag for selectively introducing air to the bag so as to control the pressure within the bag and thereby control the height that the bag supports the vehicle frame above the axle. A stabilizer bar is pivotally connected at one end to the vehicle frame and at the other end to the axle so as to cause the vehicle frame to be centered over the axle while at the same time permitting the vehicle frame to move vertically with respect to the axle. The control means includes both manual and automatic control valves for controlling the height of the frame above the axle. Electrical switches are connected to solenoids for controlling the valves so as to permit the raising and lowering of the vehicle frame with respect to the axle.

10 Claims, 8 Drawing Figures